TRANSPORTATION PLANNING

by

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Providing adequate transportation in both rural and urban areas has become one of the greatest challenges facing planners in modern times. These efforts have become a principal component in the total process of keeping pace with dynamic changes occurring throughout the world, in relationship to overall planning. The emphasis certainly is focused on the needs of all travel modes and on finding solutions for the traveling public and the never-ending flow of goods, especially in the growing urban areas.

Several basic principles of transportation planning form the necessary guidelines for successful solutions to these complex problems. These include establishing and confirming the goals and objectives for a city, region, or state, against which to test alternate transportation solutions. The transportation planner must also extend his scope beyond political boundaries and ensure integrated planning of the several system components being considered, and must include the study of optimum use of existing components of this system.

The planner must also understand the limitations of the many natural, man-made, and financial resources available. Most important, the transportation plans must recognize the personal desires, likes, and dislikes of the traveling public for adequate acceptance of the changes.

Basic Approach

Obviously, this complex process of planning for people and goods requires good organization, at both the administrative and technical levels. To accomplish this, the planning process generally follows a logical chain of events and decisions subsequent to the establishment of the goals and objectives for the area under study:

1. An inventory of existing conditions, including the infrastructure and the travel demands;

2. The identification of the social and economic parameters of the area and subareas being studied;

3. Projections of future travel demands, based in part upon past trends but more on expected changes;

4. A program of testing and evaluation of alternative solutions, facilitated through the use of high-speed electronic computers; and finally,

5. Recommendations as to the various plan segments and the implementation of the program.

At several points in this flow there are obvious opportunities of feedback to help re-evaluate the initial assumptions or "points of choice" in the process. And before adoption, the recommended plan, or its individual components, are reviewed against the area's stated goals and objectives to help ensure compliance. The transportation plan, or planning process, should therefore be designed and implemented as to fit within the overall plan for the city, the broader regional area, or the statewide objectives.

Many professional disciplines are needed to cope with complex transportation planning, especially on an integrated basis. Engineers, planners, architects, sociologists, mathematicians, geographers, economists, and many other professionals are responsible for the character of the final transportation plan, and specifically with such elements as total urban design, the health and welfare of any affected residents, economic impact, utilization of existing facilities, and general fiscal requirements of the implementation. The format of the team will vary, with the emphasis on capability to perform and to recommend ways for effectuating the proposals.

Transportation Needs are Dynamic

Since the factors which influence transportation demands are continually undergoing change, total needs for a given area are dynamic in nature. These factors affecting transportation demands include, principally:

1. The affluence of the traffic public, since recent research has shown that travel (particularly in automobiles) is directly related to the economic level of the households and only secondarily to the car ownership resulting from such affluence level;

2. The work and play habits (or desires) of the people making these trips, and these habits are currently changing to more emphasis on leisure-time activities;

3. The effects of technological change, both in the manner of performing tasks and in the vehicles used for transportation; and,

4. The "face" of the general area under study, whether it be a city or a region, since urban renewal and other shifts in the population can strongly alter topographic or "man-made" constraints on the location or construction of many transportation facilities.

It is also important to understand the projections of growth that are occurring. The population of the United States, now at 200 million, is expected to increase another 100 million in about a third of a century. The Gross National Product is expected to continue to increase, and, with that growth, the number of motor vehicles traveling on the highways will certainly increase. In addition, the travel per motor vehicle is also expected to grow on a daily or annual basis. Most important, the population is shifting to urban areas or urban regions, so that by the year 2000 more than three-quarters of all the people in the United States will live in metropolitan areas.

Several other interesting changes are occurring in travel habits. There is certainly more evening-oriented shopping. With the ownership of two homes and extended vacation periods, long-distance travel will grow rapidly. (This may cause a change in the use of airplanes or trains, and subsequent auto rentals.) There are changes in the form and function of central cities which will affect truck and car travel. But more importantly, the suburban areas are changing in size and structure, and bringing stores and offices out to the residents.

These changes seem to point to several unanswered questions of which the following are typical:

1. What is the true motivation for making trips?

2. What is the proper mix of travel modes?

3. What is the impact of transportation improvements on the social environment or the economy of the area?

4. What are the true sensory responses of people to their environment?

5. How does the impact of highways on land use vary with different types of highway?

6. What is the value of scenic enhancement on adjacent properties?

7. Can we quantify nonuser benefits by any means?

8. What are some of the consequences resulting from multiple-use of rights-of-way?

9. Have satellite cities proven effective to improve outward expansion of urban growth? How about "new towns"?

10. Can governments devise ways and means of finding additional sources of highway revenues, and is this additional source necessary?

11. Can we really have planning for the several transportation modes on an integrated basis?

12. What are the prospects for technological change in automobile transportation for the future?

The Planning Process Has Been Evolutionary

In the United States, the transportation planning process has been basically one of evolution since the advent of the motor vehicle. Initially, the process was concerned generally with isolated cases--planned in a sterile atmosphere and implemented with little regard to the other components of the system. The significant change has been one of "systems analysis," in which an improvement in one locale has substantial impact on other portions of that system or on a companion system. Now, the planners can take a more comprehensive look at the city or region and test alternatives for significant impacts on the other parts.

Generally, this evolutionary process in transportation planning has been in three eras:

1. The "pre-comprehensive" era had its emphasis on the quantitative approach, with rather limited scope. Projects were recommended which provided relief to only one sector of the problem and these could have been quite independent of other components in the total transportation system.

2. The second or "comprehensive" era pointedly related transportation to land use--both existing and potential. In this phase, the several modes of travel were considered jointly, and the scope of the planning was expanded to incorporate more than a single area or municipality. One of the key technological advances to encourage this comprehensive approach was the ability to test many alternatives or to speed up laborious calculations through use of the electronic computer. Mathematical models were developed to help synthesize and project future

trip ends, or to develop synthetic travel volumes that could then be applied mathematically to one or more of many route alternatives.

The plans resulting from this approach recognized the validity of both long- and short-range solutions and the need to achieve balance in transportation. They recognized more than single components of the plan and, in fact, interrelated the several elements of the plan including the roadways, railways, pedestrian ways, terminals, and flows of goods. They recognized also the need for improved traffic operations on existing facilities. Significantly, this transportation planning approach stressed the importance of projecting the "modal split," or (in simple terms) the relative use of private automobiles and/or public transportation.

3. Finally, and most timely, planning for transportation has achieved a "revolution in thought." A firm decision has been made to relate roadways, especially in urban areas, to total planning. The new views can be the media for effectively solving many critical problems, especially in the cities. In this approach, transportation planning can recognize the environmental and sociological needs of the residents and their area. These environments now take on both depth (or height) and time requirements. Thus, a third and fourth dimension can be added to the usual length and breadth dimensions to form "fourth-dimensional planning." In this newest era, the travelway is now considered a full partner with urban space usage in making the urban area a better place to live and work. There is special emphasis on the highway or freeway, for through modern design concepts, it can now establish a greater potential for itself as it is woven into the urban fabric.

This revolution in thought has also brought more recognition for the health and welfare of the residents through pollution and noise abatement, strict emphasis on safety for the user and nonuser, and, most importantly, the need for aesthetic design, both as viewed by the traveler and as by the adjacent resident. Such new concepts as joint modal usage of the same travel corridor, the use of air space above and below the travelway, and joint space development of transportation and other urban land uses become important aspects in modern transportation planning.

Urban Design Concept Team Formed

An excellent example of this broadest kind of highway and public transport planning yet conceived in the United States has been initiated in the City of Baltimore, as related to the Interstate Systems yet to be designed in the city. An Urban Design Concept Team, consisting of architects, planners, and engineers, can form a force strong enough to overcome many

inherent problems associated with locating urban transportation facilities.[1] Clearly, the scope of the Team's services points to imagination and foresight for the City of Baltimore and other sponsoring agencies.

In coordination with the City of Baltimore, the Maryland State Roads Commission, and several other agencies, distinct goals have been established for the Team. These goals will provide for safe, efficient, and comfortable travelways and will ensure that freeway and public transportation improvements create a minimum of damage to existing urban environment. They will help to provide a pleasant driving experience and an attractive and functional addition to the sectors of the city through which the various travelways pass. Most importantly, the work will be a responsible answer to the claims that affected people (those displaced by the travelways) have not before been considered in urban transportation planning.

With the general locations, and some specific segments, of the Interstate System assumed as a "given," the Concept Team will begin by analyzing the character of neighborhoods involved and the social, economic, visual, historic, and functional factors which should enter the design equations. In the work, the Team will be responsible for establishing the design standards and criteria for these urban Interstate freeways.

Detailed reconnaissance studies will identify "opportunities" for joint use of the right-of-way and use of adjacent land. These reconnaissances will also identify "problem points" where the freeway and the environment are presently not compatible. Alternative solutions to the "problems," and methods for capitalizing on the "opportunities," will be considered.

Throughout the design process, potential air-rights usage, adjacent-area development concepts, and other joint-development considerations will

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[1] The Team is composed of four professional firms:

1. Skidmore, Owings and Merrill, San Francisco, for urban architectural planning and design;
2. Wilbur Smith and Associates, New Haven, for traffic and transportation planning; and some other engineering aspects;
3. Parsons, Brinkerhoff, Quade and Douglas, New York, for mass transportation and general engineering; and,
4. J. E. Greiner Co., Baltimore, for general engineering and coordination with local design firms.

be advanced, with which to proceed into the definitive design and commitment stages. The next phase of the work will be a re-analysis of any detailed preliminary plans already made for the Interstate freeways in the City of Baltimore, as well as a review of any completed feasibility studies. Finally, the Design Concept Team will monitor all of its concepts in the detailed design phase to ensure compliance with the architectural and engineering standards previously provided.

In the United States, transportation planners have found it difficult to design urban highways and public transport facilities. The decision to relate these travelways to urban space should be a beneficial step. Existing precedents in integrated designs have been limited in scope, and have, therefore, provided limited impact on the transportation system. However, opportunities abound for these concepts to be applied on a larger scale as indicated by the experience in the City of Baltimore.

Many interesting examples of joint development also exist or are planned in other countries. The freeway built over shops in Tokyo, the Place Ville Marie in Montreal, or the Bull Ring Complex in Birmingham, England, are excellent responses to difficult design challenges. These cases form the basis for extension of the concepts into a broader spectrum of opportunities in urban areas.

Senator Jennings Randolph, Chairman of the U, S. Senate Public Works Committee, puts it aptly. "Our world changes as we walk--and ride on it. The most profound social and economic changes that our country has experienced in the past 100 years have taken place in the past two decades. . . These changes have had their effect and their impact on the highway program . . . But most importantly, we have only recently come to the full awareness of the impact of highways themselves."[2]

The revolution in thought can be a great step forward in transportation planning, providing a safe and efficient system within the social, economic, and aesthetic needs of the city. Multiple-use of rights-of-way can benefit the urban planner, the private developer, and the traveler. Certainly, some issues will have to be resolved--such as use of air rights and the distribution of relocation of residents--but the approach makes sense in the quest for urban transportation solutions.

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[2]Speech before American Association of State Highway Officials, Salt Lake City, Utah, October, 1967.

Interim Actions

Short-range solutions should have an equal footing in comprehensive planning. The dynamics of the city cause these actions to become "immediate" in nature, and generally benefit the present street systems. Emphasis must be placed on proper traffic management and on the optimum utilization of existing facilities. To this end, the excellent TOPICS program is now underway in several cities leading to significant improvements in general operations.[3] These efforts can be considered interim to the long-range plans, but they constitute sound planning to meet changing needs.

Implementing the Plan

A final step in the planning process is to implement the segments of the plan in the best way possible. Obviously, flexibility in the total plan is vital so that it can be responsive to various changes in development opportunities or technology that occur. It is important, moreover, through advisory committees and other public relations programs, to obtain the needed public support for transportation plans.

Priorities are obviously required for a long-range plan, since not all of the segments can be constructed at once. These priorities are established with three principal criteria in mind: (1) maximum service as each stage of the total program is constructed; (2) the comparison of staged costs with anticipated available funds; and, (3) the relationship of the plan segments to land-development objectives. In the evaluation of transportation plans, conventional benefits-cost relationships have often been the logical point of departure. But in themselves they are not wholly sufficient. It is necessary to consider many factors and benefits that do not have precise monetary bases, such as broad economic impacts, social impacts, aesthetics of design, effects on health, and other general environmental conditions difficult to price. This is the face of modern transportation planning.

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[3] Traffic Operations Program for Increasing Capacity and Safety.